README document for FLEXPART organic carbon aerosol L4 global daily 1 x 1 degrees V1 (OCFLEXPART), available at the GES DISC, https://dx.doi.org://10.5067/L4CD2D15VU2G.

File naming convention.
FLEXPART_organic_carbon_aerosol_L4_global_daily_1x1_degrees_V1_xxxx.nc, where xxxx refers to year, from 2008 to 2015.

Dataset description.

This is a global simulation of organic carbon (OC) aerosol concentrations and daily deposition (wet + dry) from the FLEX-ible PARTicle (FLEXPART) Lagrangian particle dispersion model version 10.4 (Pisso et al., 2019) for the years 2008-2015. The FLEXPART model code are open source and freely available at https://www.flexpart.eu/, with source code updates for FLEXPART version 10.4 described in Pisso et al. (2019). In the simulations presented here, the model was forced by ERA-Interim meteorological fields from the European Centre for Medium-Range Weather Forecasts (ECMWF) at 1° x 1° spatial and 3-hourly temporal resolution. In addition to dry and wet deposition, FLEXPART accounts for turbulence (Cassiani et al., 2015), unresolved mesoscale motions (Stohl et al., 2005) and includes a deep convection scheme (Forster et al., 2007). Gravitational settling, dry deposition and in-cloud and below-cloud scavenging are also included (Grythe et al., 2017).

OC does not chemically age over time or interact with other aerosol types in the model and it is assumed to be hydrophilic. OC concentrations were calculated from both anthropogenic emissions (using ECLIPSEv6b) and biomass burning (GFED4.1s (Giglio et al., 2013)), following Klimont et al. (2017) but with updated emissions factors (Z. Klimont, pers. comm.). The tracking of OC particles includes gravitational settling for all spherical particles, and OC aerosols have assumed mean diameters of 0.25 μm, a logarithmic standard deviation of 0.3, and a particle density of 1500 kg m^{-3} (Long et al., 2013). The OC emissions datasets may not include some local sources of combustion aerosols.

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Dataset usage. Organic carbon aerosol information is at daily 1° x 1° resolution with global coverage for the years 2008-2015. Corresponding latitudes (-89.5 to 89.5 degrees North) and longitudes (-178.5 to 180.5 degrees East) for grid cell centers are also provided. Organic carbon daily wet + dry deposition grids are separated by anthropogenic and biomass burning sources ('Organic carbon daily deposition from ANThropogenic sources' and 'Organic carbon daily deposition from Biomass Burning', respectively). Organic carbon concentration grids have upper vertical layer boundaries of 10, 100, 250, 500, 750, 1000, 1500, 2000, 4000, 6000, 8000, 10,000, 15,000, and 20,000 m above ground level and are also separated by anthropogenic and biomass burning sources ('Daily Organic Carbon concentrations from ANThropogenic sources' and 'Daily Organic Carbon concentrations from Biomass Burning', respectively).

Dataset availability. Organic carbon deposition and concentrations for anthropogenic and biomass burning sources from 2008-2015 are available from the Goddard Earth Sciences Data and Information Services Center (GES DISC; https://dx.doi.org://10.5067/L4CD2D15VU2G).

Dataset variables:

- **latitude** an array of latitude centers from -89.5 to 89.5 with each center corresponding to a row of the concentration and deposition grids. Units are degrees north. Dimensions: [180].
- **longitude** an array of longitude centers from -178.5 to 180.5 with each center corresponding to a column of the concentration and deposition grids. Units are degrees east. Dimensions: [360].
- **altitude** an array of upper vertical layer boundaries of 10, 100, 250, 500, 750, 1000, 1500, 2000, 4000, 6000, 8000, 10000, 15000, and 20000 m. Units are meters above ground level. Dimensions: [14].
- **time** an array of time values. Units are days since 1970-01-01 00:00 UTC. Dimensions: [either 365 or 366, depending on the number of days in the year].
- **OC_depo_ANT, OC_depo_BB** organic carbon wet + dry daily deposition rate grids at 1° x 1° resolution for anthropogenic and biomass burning sources, respectively. Units are ng m^{-2}. Each grid has global spatial coverage with grid cell centers from -89.5 to 89.5 degrees north latitude and -178.5 to 180.5 degrees east longitude. Dimensions: [360, 180, 365] or [360, 180, 366] depending on the time array length for each year.
- **OC_conc_ANT, OC_conc_BB** organic carbon concentration grids at 1° x 1° horizontal resolution and upper vertical layer boundaries of 10, 100, 250, 500, 750, 1000, 1500, 2000, 4000, 6000, 8000, 10,000, 15,000, and 20,000 m above ground level for anthropogenic and biomass burning sources, respectively. Units are ng m^{-3}. Each grid has global spatial coverage with grid cell centers from -89.5 to 89.5 degrees north

latitude and -178.5 to 180.5 degrees east longitude. Dimensions: [360, 180, 14, 365] or [360, 180, 14, 366] depending on the time array length for each year.

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